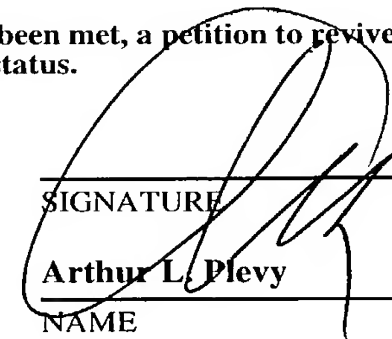


FORM PTO-1390 (Modified) (REV 11-2000)		U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371		ATTORNEY'S DOCKET NUMBER Cinquin-2	
INTERNATIONAL APPLICATION NO PCT/FR00/02041		U.S. APPLICATION NO (IF KNOWN, SEE 37 CFR 10/031052	
INTERNATIONAL FILING DATE 13 July 2000		PRIORITY DATE CLAIMED 15 July 1999	
TITLE OF INVENTION PNEUMATIC DISPLACEMENT SYSTEM			
APPLICANT(S) FOR DO/EO/US Philippe Cinquin and Jocelyne Troccaz			
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information: <ol style="list-style-type: none"> 1. <input checked="" type="checkbox"/> This is a FIRST submission of items concerning a filing under 35 U.S.C. 371. 2. <input type="checkbox"/> This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371. 3. <input checked="" type="checkbox"/> This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (24) indicated below. 4. <input checked="" type="checkbox"/> The US has been elected by the expiration of 19 months from the priority date (Article 31). 5. <input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371 (c) (2)) <ol style="list-style-type: none"> a. <input type="checkbox"/> is attached hereto (required only if not communicated by the International Bureau). b. <input checked="" type="checkbox"/> has been communicated by the International Bureau. c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US). 6. <input checked="" type="checkbox"/> An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)). <ol style="list-style-type: none"> a. <input checked="" type="checkbox"/> is attached hereto. b. <input type="checkbox"/> has been previously submitted under 35 U.S.C. 154(d)(4). 7. <input type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3)) <ol style="list-style-type: none"> a. <input type="checkbox"/> are attached hereto (required only if not communicated by the International Bureau). b. <input type="checkbox"/> have been communicated by the International Bureau. c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired. d. <input type="checkbox"/> have not been made and will not be made. 8. <input type="checkbox"/> An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)). 9. <input type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)). 10. <input type="checkbox"/> An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)). 11. <input type="checkbox"/> A copy of the International Preliminary Examination Report (PCT/IPEA/409). 12. <input checked="" type="checkbox"/> A copy of the International Search Report (PCT/ISA/210). <p>Items 13 to 20 below concern document(s) or information included:</p> <ol style="list-style-type: none"> 13. <input type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.97 and 1.98. 14. <input type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included. 15. <input checked="" type="checkbox"/> A FIRST preliminary amendment. 16. <input type="checkbox"/> A SECOND or SUBSEQUENT preliminary amendment. 17. <input type="checkbox"/> A substitute specification. 18. <input type="checkbox"/> A change of power of attorney and/or address letter. 19. <input type="checkbox"/> A computer-readable form of the sequence listing in accordance with PCT Rule 13ter 2 and 35 U.S.C. 1.821 - 1.825. 20. <input type="checkbox"/> A second copy of the published international application under 35 U.S.C. 154(d)(4). 21. <input type="checkbox"/> A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4). 22. <input checked="" type="checkbox"/> Certificate of Mailing by Express Mail 23. <input type="checkbox"/> Other items or information: 			

531 Rec'd PCT/FR 15 JAN 2002

U.S. APPLICATION NO (IF KNOWN, SEE 37 CFR 1.492 (a)(1) - (5)) : 10/031052	INTERNATIONAL APPLICATION NO PCT/FR00/02041	ATTORNEY'S DOCKET NUMBER Cinquin-2																
24. The following fees are submitted: BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) : <input type="checkbox"/> Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO \$1040.00 <input checked="" type="checkbox"/> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO \$890.00 <input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO \$740.00 <input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) \$710.00 <input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) \$100.00 ENTER APPROPRIATE BASIC FEE AMOUNT =		CALCULATIONS PTO USE ONLY																
Surcharge of \$130.00 for furnishing the oath or declaration later than months from the earliest claimed priority date (37 CFR 1.492 (e)). <input type="checkbox"/> 20 <input type="checkbox"/> 30		\$890.00																
<table border="1" style="width: 100%; border-collapse: collapse;"><thead><tr><th style="width: 15%;">CLAIMS</th><th style="width: 25%;">NUMBER FILED</th><th style="width: 25%;">NUMBER EXTRA</th><th style="width: 35%;">RATE</th></tr></thead><tbody><tr><td>Total claims</td><td>14 - 20 =</td><td>0</td><td>x \$18.00</td></tr><tr><td>Independent claims</td><td>1 - 3 =</td><td>0</td><td>x \$84.00</td></tr><tr><td colspan="3">Multiple Dependent Claims (check if applicable). <input type="checkbox"/></td><td></td></tr></tbody></table>		CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	Total claims	14 - 20 =	0	x \$18.00	Independent claims	1 - 3 =	0	x \$84.00	Multiple Dependent Claims (check if applicable). <input type="checkbox"/>				\$0.00
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE															
Total claims	14 - 20 =	0	x \$18.00															
Independent claims	1 - 3 =	0	x \$84.00															
Multiple Dependent Claims (check if applicable). <input type="checkbox"/>																		
TOTAL OF ABOVE CALCULATIONS =		\$890.00																
<input checked="" type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27). The fees indicated above are reduced by 1/2.		\$445.00																
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Processing fee of \$130.00 for furnishing the English translation later than months from the earliest claimed priority date (37 CFR 1.492 (f)) <input type="checkbox"/> 20 <input type="checkbox"/> 30 +		\$0.00																
TOTAL NATIONAL FEE =		\$445.00																
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) (check if applicable). <input type="checkbox"/>		\$0.00																
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charged	\$																	
<p>a. <input checked="" type="checkbox"/> A check in the amount of \$445.00 to cover the above fees is enclosed.</p> <p>b. <input type="checkbox"/> Please charge my Deposit Account No. _____ in the amount of _____ to cover the above fees. A duplicate copy of this sheet is enclosed.</p> <p>c. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 04-1679 A duplicate copy of this sheet is enclosed.</p> <p>d. <input type="checkbox"/> Fees are to be charged to a credit card. WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.</p>																		
<p>NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.</p> <p>SEND ALL CORRESPONDENCE TO:</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"><p>Arthur L. Plevy Registration No.24,277 DUANE MORRIS LLP 100 College Road West, Suite 100 Princeton, NJ 08540 (609) 919-4400</p></div>																		
<div style="display: flex; justify-content: space-between;"><div style="width: 45%;"><p>SIGNATURE _____ Arthur L. Plevy NAME _____ 24,277 REGISTRATION NUMBER _____ 15 January 2002 DATE _____</p></div><div style="width: 50%; text-align: center;"></div></div>																		

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15 JAN 2002

#3/a

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: **Cinquin, et al.**

Examiner: **To be assigned**

Serial No.: **To be assigned**

Group Art Unit: **To be assigned**

Filed: **Herewith**

Attorney Docket No.: **Cinquin-2**

For: **PNEUMATIC DISPLACEMENT
SYSTEM**

Date: **January 15, 2002**

Box PATENT APPLICATION
Commissioner for Patents
U.S. Patent & Trademark Office
Washington, DC 20231

Sir:

PRELIMINARY AMENDMENT

Prior to examination, kindly amend the application as follows:

IN THE SPECIFICATION:

After the title, and before the first paragraph insert the following:

--This application is filed under 35 U.S.C. § 371 and claims priority rights under 35 U.S.C. §§ 119 and 365 from International application number PCT/FR00/02041, filed on July 13, 2000, and from French application 99/09362, filed on July 15, 1999, the entire disclosures of which are hereby incorporated by reference.—

IN THE CLAIMS:

Please enter rewritten claim 8 as follows:

8. (Amended) The system of claim 1, characterized in that at least one of the pulleys is linked to a fixed point via a resilient means.

Please add the following new claims:

Cinquin-2

9. (New) The system of claim 2, characterized in that at least one of the pulleys is linked to a fixed point via a resilient means.

10. (New) The system of claim 3, characterized in that at least one of the pulleys is linked to a fixed point via a resilient means.

11. (New) The system of claim 4, characterized in that at least one of the pulleys is linked to a fixed point via a resilient means.

12. (New) The system of claim 5, characterized in that at least one of the pulleys is linked to a fixed point via a resilient means.

13. (New) The system of claim 6, characterized in that at least one of the pulleys is linked to a fixed point via a resilient means.

14. (New) The system of claim 7, characterized in that at least one of the pulleys is linked to a fixed point via a resilient means.

REMARKS

Entry of this preliminary amendment is respectfully requested. Claim 8 has been amended to eliminate multiple dependency. New claims 9 – 14 substantially correspond to claim 8, and have been added to retain the claims lost by eliminating the multiple dependency of claim 8.

Dated: January 15, 2002

DUANE MORRIS LLP
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Princeton, New Jersey 08540
(609) 919-4432 (Telephone)
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Respectfully submitted,

Arthur L. Plevy, Reg. No. 24,277
Attorney For Applicants

10031052-060502

10/031052

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Cinquin-2

VERSION SHOWING CHANGES MADE

IN THE CLAIMS:

8. (Amended) The system of [any of claims 1 to 7] claim 1, characterized in that at least one of the pulleys is linked to a fixed point via a resilient means.

1/PRTS

PNEUMATIC DISPLACEMENT SYSTEM

The present invention relates to a pneumatic displacement system.

Pneumatic drive systems, currently called "artificial muscles", are known, which are formed of inflatable tubes inserted in protection braids, such that the artificial muscle contracts or expands according to whether its internal fluid pressure increases or decreases. Such artificial muscles are, for example, described by B. Tondu and P. Lopez in "Compte rendu de l'Académie des Sciences", t. 320, pp. 105-114, 1995. In particular, such "muscles" have been designed, which can have a length on the order of some ten centimeters and a diameter on the order of from 1 to 3 cm and which provide a contraction of the order of from 10 to 20% of their length when their internal pressure varies from the atmospheric pressure to a pressure which is 4 to 5 times greater. Such systems have the advantage of exhibiting an excellent power-to-weight ratio. For example, an artificial muscle having a weight on the order of from 50 to 100 grams can exert a force on the order of 1,000 newtons, that is, for example, lift a load on the order of 100 kg. Such drive systems are well adapted to an operation in hospital surroundings since they are clean, non polluting, and lend themselves to disinfection/sterilization operations. Further,

they only use low-power and low-voltage electricity sources to control electrovalves. Further, compressed air sources are currently available in hospitals.

However, such systems have a disadvantage linked to
5 their small movement which, as indicated, is on the order of 10 to 20% only between their idle position and their active position.

The present invention aims at providing a pneumatic displacement system exhibiting the same lightness, reliability,
10 and security advantages as the above-mentioned artificial muscles, but further having a wide movement.

To achieve this object, the present invention provides a system of pneumatic displacement of a cable stretched in a loop between at least two pulleys, including at least one
15 "artificial muscle" inserted on a portion of the loop, the length of this artificial muscle varying according to whether it is or not under pressure, a means for putting or not the artificial muscle under pressure, and means for alternately blocking two of said pulleys in at least one rotation direction.

20 According to an embodiment of the present invention, the system includes a single artificial muscle arranged on a branch of the loop and a resilient cable.

According to an embodiment of the present invention, the system includes several artificial muscles in series
25 arranged on the same branch of the loop.

According to an embodiment of the present invention, the system includes at least two artificial muscles respectively located on either side of a pulley, and means for putting under pressure in a complementary manner said artificial muscles at
30 the rate at which the pulleys are blocked and unblocked. The cable is resilient.

According to an embodiment of the present invention, a device to be moved is directly linked to the cable.

According to an embodiment of the present invention, a
35 device to be moved is linked to the cable via a pulley transmission system.

According to an embodiment of the present invention, at least one of the pulleys is linked to a fixed point via a resilient means.

5 The foregoing objects, features and advantages of the present invention, will be discussed in detail in the following non-limiting description of specific embodiments in connection with the accompanying drawings, wherein:

10 Figs. 1A to 1H show successive phases of operation of a device according to a first embodiment of the present invention; and

Figs. 2A to 2H show successive phases of operation of a device according to a second embodiment of the present invention.

15 Fig. 1A very schematically shows a first embodiment of a pneumatic displacement system according to the present invention. This system includes a cable, wire, strip, or strap stretched in a closed loop between two pulleys 2 and 3. Each of the pulleys is associated with a remotely controllable blocking system, for example, a pneumatic brake or a spring ratchet wheel
20 with a removable locking ratchet, the ratchet being controllable by pneumatic means or by a solenoid. In the loop formed by cable 1 is inserted an artificial muscle 5 such as previously defined. It should be noted that it may be a one-way or two-way blocking system. In Fig. 1A, this muscle is shown in expanded position,
25 which corresponds, for example, to its state under low pressure. Reference A has been used to indicate a point close to an end of artificial muscle 5 and reference B has been used to indicate a point located on the other loop branch. The fact that pulley 2 is blocked (or only allows counterclockwise rotations) has been represented by an arrow. It is also assumed that cable 1 has a
30 certain resilience. Thus, in the state shown in Fig. 1, this cable exhibits a first tension.

Fig. 1B shows the same structure, with pulley 2 being still blocked and pulley 3 still free, but artificial muscle 5
35 being contracted. The cable tension increases towards a second tension value. Point A moves to the right and point B also moves to the right.

At the step of Fig. 1C, the muscle is maintained in the contracted state, but this time, pulley 3 is blocked and pulley 2 is free. Nothing changes in the motion of the various cable points, which remains in the second tension state.

5 At the step of Fig. 1D, pulley 3 still being blocked, the artificial muscle is expanded: point A moves to the left and point B moves to the right.

 At the steps of Figs. 1E and 1F, pulley 2 is blocked and pulley 3 is free. At the step of Fig. 1E, nothing has been
10 modified. At the step of Fig. 1F, the artificial muscle has been contracted. Point A has moved to the right, and so has point B.

 At the steps of Figs. 1G and 1H, pulley 3 is blocked and pulley 2 is freed. In Fig. 1G, nothing has been modified. In Fig. 1H, the artificial muscle has expanded, point A has moved
15 to the left and point B has moved to the right.

 It can thus be seen that by alternating the blocking of pulleys 2 and 3 and by causing at the same rate contractions and expansions of the artificial muscle, the loop points turn counterclockwise. Point B regularly rotates while point A moves
20 forwards and backwards, the forward motions being more significant than the backward motions. Of course, the rotation direction could be inverted to pass from an expanded state to a contracted state while pulley 3, rather than pulley 2, is blocked.

25 Considering that an element linked to point B is desired to be displaced, the displacement speed of this element may be modified by modifying the frequency of the switchings between the blocked and free states of the two pulleys, correlatively the frequency of the expanded/contracted switchings of
30 muscle 5. For a given artificial muscle, the amplitude of the incremental displacements may be modified by modifying the difference between the maximum and minimum pressures provided to obtain the contracted and expanded states. Several artificial muscles may also be arranged in series on a same strip.

35 The system may have a continuous operation, providing that artificial muscle 5 can, like cable 1, turn around each of the pulleys. In this last case, it will be preferred to use

systems with at least two artificial muscles in series, a single muscle being switched at a given time, and the muscle turning around a pulley being inhibited while it is around said pulley.

A system according to the present invention easily
 5 lends itself to a control at a frequency on the order of 10 counts per second, which corresponds, if the possible movement of each muscle is on the order of 2 cm, at a 20-cm/s speed. This speed is perfectly compatible with a great number of applications, especially with remote-handling type applications. It may
 10 also be provided to use a common pneumatic supply for the inflating/deflating of the artificial muscles and for the pulley stop/blocking control. Electrovalves may be provided to be connected to the various elements, the electrovalves being possibly driven by a computer.

15 Fig. 2A shows a second embodiment of the present invention in a first state. A cable 1 is present between pulleys 2 and 3 which can alternately be blocked (bidirectional blocking). Two artificial muscles 11 and 12 are arranged on the opposite branches of the loop. The two muscles are expanded and
 20 contracted in opposition. For example, muscle 11 is expanded when pulley 2 is blocked and muscle 12 is expanded when pulley 3 is blocked. In the phase between Figs. 2A and 2B, pulley 2 is blocked, muscle 11 is contracted and muscle 12 is expanded. In this phase, the cable portion between the blocked pulley and
 25 each of the artificial muscles remains motionless (point A) and the cable portion between the free pulley and each of the artificial muscles (point B) moves counterclockwise. In this embodiment, the system operation does not require for the cable to be resilient, although a slightly resilient cable may be
 30 chosen for other reasons.

In the phase between the states shown in Figs. 2C and 2D, point A moves counterclockwise while point B remains fixed. Successive displacement phases are illustrated in Figs. 2E to 2H. It can be seen that, conversely to the case of the first
 35 embodiment, there are no phases in which a given point of the cable moves backwards. Each of the points either moves forwards

or remains fixed at each step. This may be an advantage in many applications.

The various alternatives described in relation with Fig. 1 will also apply to the embodiment of Fig. 2 as concerns
 5 the ways of modifying the cable rotating speed, of modifying the amplitude of the elementary increments, and of multiplying or not the number of elements. Further, in the system of Fig. 2, in which artificial muscles operate in opposition, power conservation means partially using the power stored in an inflated
 10 muscle to take part in the inflating of a deflated muscle while the first muscle must deflate, may be provided. It may also be provided for one of the muscles to vary between two high pressures, for example five times and four times the atmospheric pressure, while another one varies between two intermediary
 15 pressures, for example, twice and once the atmospheric pressure. This may facilitate power transfers from one muscle to the other.

The present invention may be applied to many systems in which a mechanical displacement is desired to be implemented.
 20 The element to be moved must be directly or indirectly linked to cable 1 of the first or second embodiment of the present invention.

According to an alternative of the present invention, additional pulleys may be added to modify the cable path and the
 25 path of the element to be displaced or to facilitate this path.

According to an advantage of the present invention, in the case where cable 1 is resilient, the system enables limiting the maximum constraint which can be applied to the driven element, which provides an often desirable security function in
 30 medical applications.

The end pulleys may also be provided, instead of being assembled on fixed points, to be assembled on these points via resilient elements such as springs. Otherwise, the element linked to the rotating cable may be provided to be associated to
 35 this cable via a transmission pulley system which ensures the desired resilience.

As an example of application to the medical field, one or several systems according to the present invention may be used to displace and position a diagnosis device or a therapeutic device on the human body, the cable link providing
 5 for this type of application the advantage of a great flexibility of implementation.

CLAIMS

1. A system of pneumatic displacement of a cable (1) stretched in a loop between at least two pulleys (2, 3), characterized in that it includes:

5 at least one "artificial muscle" (5; 11, 12) inserted on a portion of the loop, the length of this artificial muscle varying according to whether it is or not under pressure,

a means for putting or not the artificial muscle under pressure, and

10 means for alternately blocking two of said pulleys in at least one rotation direction.

2. The system of claim 1, characterized in that it includes a single artificial muscle (5) arranged on a branch of the loop and a resilient cable.

15 3. The system of claim 2, characterized in that it includes several artificial muscles in series arranged on the same branch of the loop.

4. The system of claim 1, characterized in that it includes at least two artificial muscles (11, 12) respectively located on either side of a pulley, and means for putting under 20 pressure in a complementary manner said artificial muscles at the rate at which the pulleys are blocked and unblocked.

5. The system of claim 4, characterized in that the cable is resilient.

25 6. The system of claim 1, characterized in that a device to be moved is directly linked to the cable.

7. The system of claim 1, characterized in that a device to be moved is linked to the cable via a pulley transmission system.

30 8. The system of any of claims 1 to 7, characterized in that at least one of the pulleys is linked to a fixed point via a resilient means.

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EN MATIÈRE DE BREVETS (PCT)**

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(21) Numéro de la demande internationale:
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(74) Mandataire: DE BEAUMONT, Michel; Cabinet Conseil, 1, rue Champollion, F-38000 Grenoble (FR).

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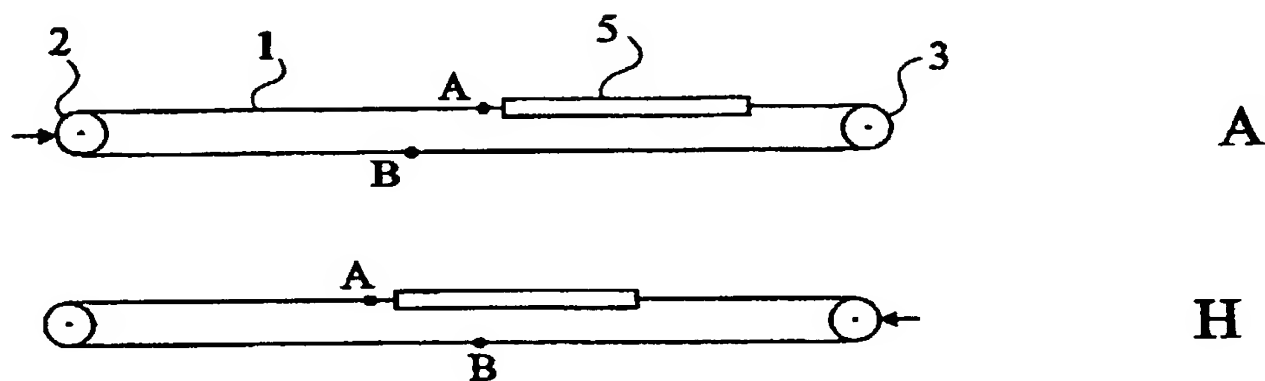
En ce qui concerne les codes à deux lettres et autres abréviations, se référer aux "Notes explicatives relatives aux codes et abréviations" figurant au début de chaque numéro ordinaire de la Gazette du PCT.

(72) Inventeurs; et

(75) Inventeurs/Déposants (pour US seulement): CINQUIN,
Philippe [FR/FR]; 15, Chemin de la Bastille, F-38700 La

(54) Title: PNEUMATIC DISPLACEMENT SYSTEM

(54) Titre: SYSTEME DE DEPLACEMENT PNEUMATIQUE



(57) Abstract: The invention concerns a pneumatic system for displacing a cable (1) stretched in a loop between at least two pulleys (2, 3). Said system comprises at least an artificial muscle (5) inserted over a portion of the loop, the length of said artificial muscle varying depending on whether or not it is under pressure, means for pressurising or not the artificial muscle, and means for alternately blocking two of said pulleys in a least one rotating direction.

(57) Abrégé: L'invention concerne un système de déplacement pneumatique d'un câble (1) tendu en boucle entre au moins deux poulies (2, 3). Ce système comprend au moins un "muscle artificiel" (5) inséré sur une portion de la boucle, la longueur de ce muscle artificiel variant selon qu'il est ou non sous pression, un moyen pour mettre sous pression ou non le muscle artificiel, et des moyens pour bloquer alternativement deux desdites poulies dans au moins un sens de rotation.

WO 01/06132 A1

1/1

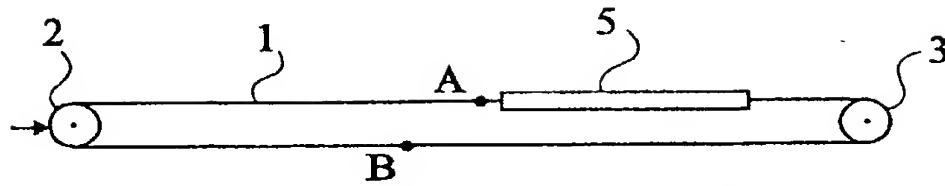


Fig 1A

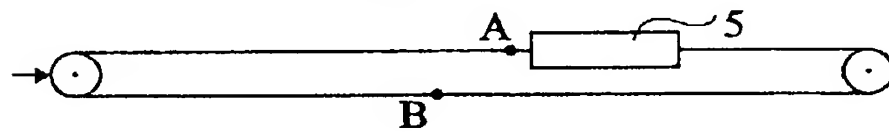


Fig 1B

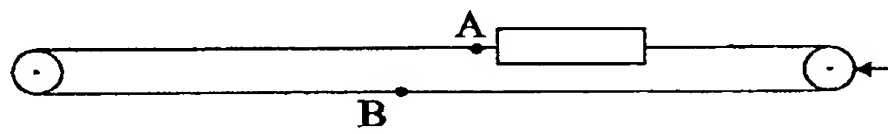


Fig 1C

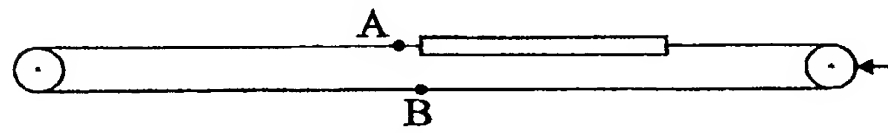


Fig 1D

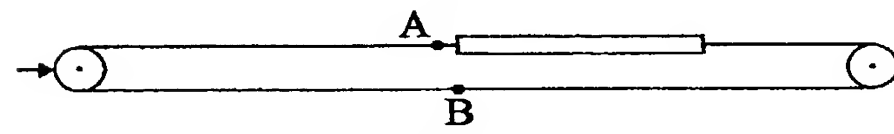


Fig 1E

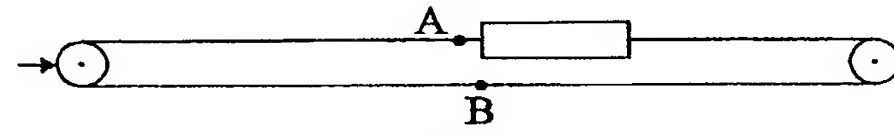


Fig 1F

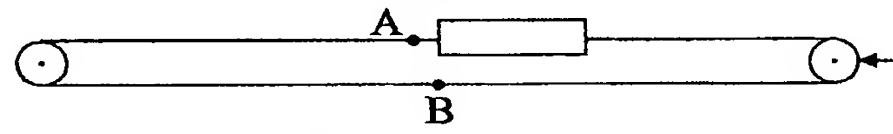


Fig 1G

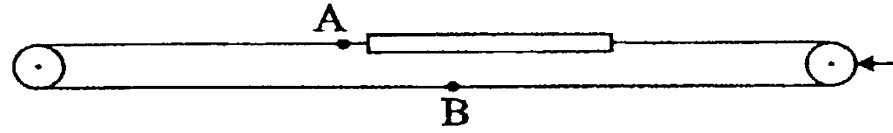


Fig 1H

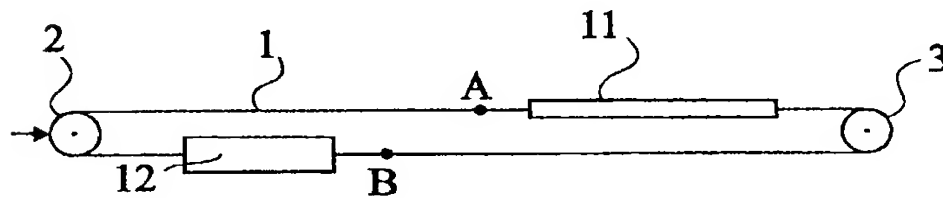


Fig 2A

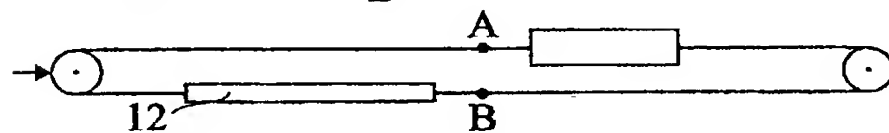


Fig 2B

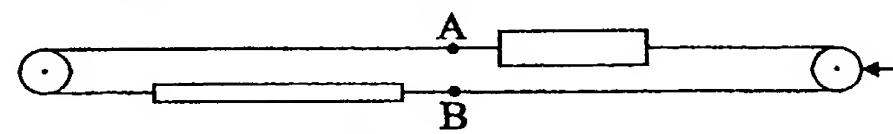


Fig 2C

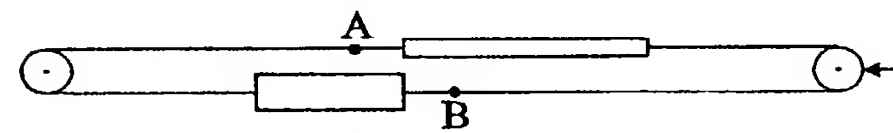


Fig 2D

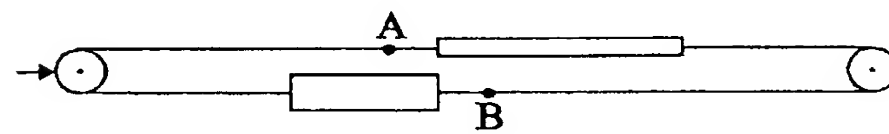


Fig 2E

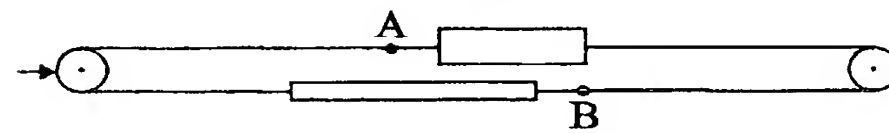


Fig 2F

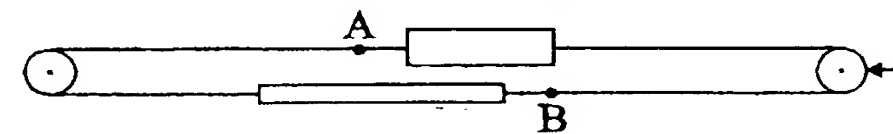


Fig 2G

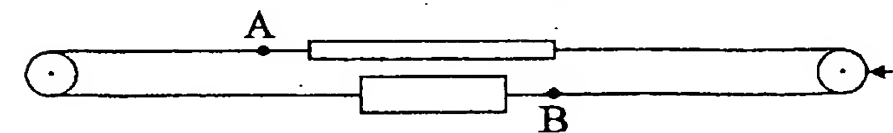


Fig 2H

Express Mail Label No. EL7969804US

Docket No.
CINQUIN-2

Declaration and Power of Attorney For Patent Application
English Language Declaration

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

PNEUMATIC DISPLACEMENT SYSTEM

the specification of which
(check one)

☐ is attached hereto.

☒ was filed on 15 JANUARY 2002 as United States Application No. or PCT International

Application Number 10/031 052

and was amended on _____

(if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119(a)-(d) or Section 365(b) of any foreign application(s) for patent or inventor's certificate, or Section 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate or PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s)

Priority Not Claimed

<u>99/09362</u>	<u>FRANCE</u>	<u>15 JULY 1999</u>	<input type="checkbox"/>
(Number)	(Country)	(Day/Month/Year Filed)	
<u>PCT/FR00/02041</u>	<u>PCT</u>	<u>13 JULY 2000</u>	<input type="checkbox"/>
(Number)	(Country)	(Day/Month/Year Filed)	
_____	_____	_____	<input type="checkbox"/>
(Number)	(Country)	(Day/Month/Year Filed)	

I hereby claim the benefit under 35 U.S.C. Section 119(e) of any United States provisional application(s) listed below:

(Application Serial No.)

(Filing Date)

(Application Serial No.)

(Filing Date)

(Application Serial No.)

(Filing Date)

I hereby claim the benefit under 35 U. S. C. Section 120 of any United States application(s), or Section 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. Section 112, I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, C. F. R., Section 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application:

(Application Serial No.)

(Filing Date)

(Status)
(patented, pending, abandoned)

(Application Serial No.)

(Filing Date)

(Status)
(patented, pending, abandoned)

(Application Serial No.)

(Filing Date)

(Status)
(patented, pending, abandoned)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (list name and registration number)



28581

PATENT TRADEMARK OFFICE

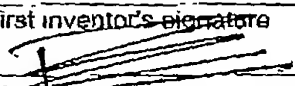
Any attorney associated with Customer No. 28581

Send Correspondence to: The address associated with Customer No. 28581

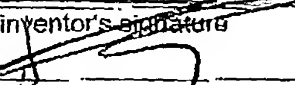
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1-00

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